The Chronicle

of the Early American Industries Association, Inc.

Volume XII March, 1959 Number 1

# Spring Meeting - Old Saugus Iron Works

J. Sanger Attwill

*(The 1959 spring meeting, June 26, 27, and 28, of the Early American Industries Association will be held at Old Saugus, Massachusetts. The following account will acquaint members with the many interesting places we will visit.)*

In 1630, after a long voyage from England, the Ship *Arbella* and its accompanying flotilla dropped anchor in Salem Harbour. Its band of adventurous pioneers landed at what is now Pioneer Village, at present restored to show the living conditions at that time and is part of the historical tour of Salem.

John Winthrop, who later became the first governor of the Massachusetts Bay Colony, was among the passengers of the *Arbella* and carried with him the Massachusetts Bay Charter. In his trip overland to Boston, he and his entourage crossed the Saugus River at a very narrow ford which was to become later most vital to the settlements in Massachusetts Bay.

*Ironmasters House — "Lin Iron Works" Village of Hammersmith, Saugus, Massachusetts.*

Governor Winthrop's son John Jr., who either arrived with the Governor or followed soon after, had been educated at the University of Dublin, Ireland in the art of Metallurgy and apparently was well acquainted with the manufacture of iron. He proceeded to prospect the land from the Province of Maine to Cape Cod in search of necessary mineral deposits and returned to England about 1642 in hopes of interesting investors to finance an industrial venture in the New England Colonies. Samples of bog iron ore which he had taken with him revealed the quality of the iron he had found. In England, at this time by order of the King, the production of iron had been restricted due to the destruction of so much timber to produce charcoal for the furnaces. In Ireland a strong feeling against England had resulted in the destruction of many English-owned furnaces. It was natural that under such circumstances England was seeking new sources of supply, and the New England colonies provided an ideal opportunity. It probably was not difficult for John Winthrop, Jr. to interest a group of men consisting of Merchants, Tailors, and Ministers to subscribe a thousand pounds sterling to form a Company of Undertakers for the Iron Works in America.

*Lin Iron Works.*

In 1644, Winthrop returned to New England in the ship *Ann Cleve* and brought with him the necessary tools, skilled ironworkers and builders to erect a furnace at Braintree, Massachusetts and simultaneously a complete plant at Saugus, then called Lin, on the Saugus River at about the same spot where his father had crossed when going to Boston. The iron works was called the *Lin Iron Workes* at the village of *Hammersmith*. This region was originally called *Saugus*, an indian name, but was changed to *Lin* in 1637 and remained so until Saugus became a separate town in 1815 and resumed its original name.

When the furnace was first erected, bog iron was converted into cast iron sow and pig bars and probably firebacks were made. Molten iron was run directly into sand beds and kettles were made by molten iron ladled from the furnace and poured into clay molds made by a potter.

The bog iron was melted down in the furnace by an intense heat from charcoal under a forced blast, blown by a pair of huge bellows operated by a sixteen foot overshot waterwheel turning a huge oak shaft. The impurities or slag were floated off by the use of Rockmine, a gabbro rock containing a portion of iron which was procured from the Peninsula of Nahant. This furnace produced about eight tons a week and operated twenty-four

*Ironworks whatsits in Museum.*

hours a day continuously from the spring thaw until the fall freeze. Part of the production was sent to England in bar form and the rest taken to the refinery or forge where the cast iron sow and pig bars were converted into wrought iron bars by the blows of an enormous 500 pound hammer operated by a large breast or pitchback wheel. The reheating processes in the forge were done in heating ovens provided with a double pair of bellows operated by three undershot wheels.

The next step in the processing of iron was the slitting mill. In 1646 there were only twelve such known mills in the world. Here the iron bars were reheated in

*Ironworks ladle, excavated at site.*

*Claw Hammerhead with decorations, excavated at ironworks.*

an oven, then put through rollers that rolled them into *flats* about three inches in width, one quarter inch in thickness and in varying lengths. Heated again, the *flats* were cut by huge shears into lengths of about eighteen inches and then passed through a series of cutters which produced rods about one quarter inch square and eighteen inches long. These were put up into bundles and placed in the warehouse for shipment or sale to the local blacksmiths who in turn converted these rods primarily into nails, hinges, latches, and other hardware needed so urgently in housebuilding and everyday life. This interesting machinery is operated by enormous wooden cogwheels attached to large oak shafts turned by a pair of overshot waterwheels. One wheel is set just forward of the other, creating a stirring sight as the water drops in and out of the buckets and splashes down the tailrace made of slag iron.

Among the other buildings in the restoration, are the Warehouse, Wharf and Museum. The latter contains excavated artifacts, numerous tools, some identified and some not, that should prove of interest to the members. Some of the important items in the museum are portions of the original 17th century furnace waterwheel, tailrace, tuyere pipe, 505 pound hammerhead, anvil base, a huge oak stump 5 to 6 feet in diameter, tools of various uses such as hammerheads, tongs, shovels, weights, axe heads, parts of kettles, cannonballs, fishhooks, and a refuse piece from the slitting mill which reveals the manner in which nail stock was cut. Other interesting items are clay pipes and fig-shaped bowl spoons showing the three examples known as the Trifid, Seal Top, and Slip End.

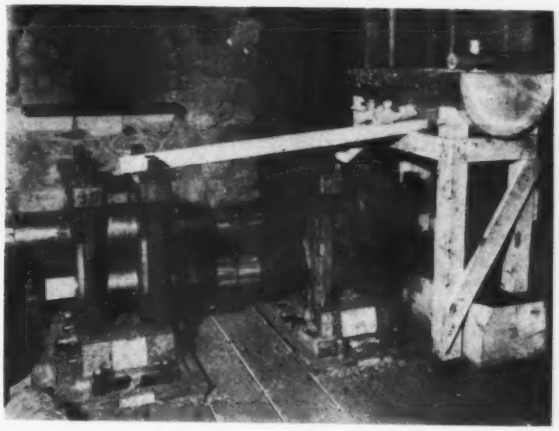
Brass Pins create great interest as they were made in what appears to have been the experimental shop and forge of the famous Joseph Jenks to whom has been attributed the making of the dies of the *Pine Tree* and *Oak Tree Shillings,* the first fire engine for the town of Boston, and who received the first patent for *Engins of Mils to goe by Water.* Three of his water wheels have been found and preserved but at present are not on exhibit.

Last but not least, is the Iron Master's House, restored to its 17th century appearance by Wallace Nutting in 1915. It was first purchased by the Ford Trade School and presented to Henry Ford on his eightieth birthday and was to have been removed to Greenfield Village,

*Refuse piece excavated which shows what the flats were like and also rods for making nails, hinges, etc.*

*Cog and Lantern Wheels which operate the rolling and slitting Mill.*

*Shaft and double bellows operating air blast for heating oven or refinery in Forge.*



*Interior rolling and slitting Mill.*

*500 pound hammer at Forge.*

*Great Room or Iron Masters Office in Iron Masters House.*

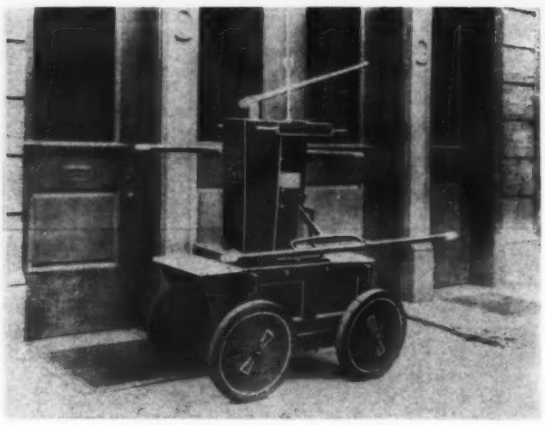
Dearborn, Michigan. However, aroused public sentiment prevented this and ultimately this resulted in the excavation and restoration of Old Saugus by the Steel Industry of America. The house is furnished in the 17th century manner with two varying examples of court cupboards, carver and wainscot chairs, bible box, bedsteads, chest and deerskin rugs and has a large ten foot fireplace filled with cooking utensils. The house and furnishings will afford our members an excellent opportunity to study the mode of living of this period.

## ESSEX INSTITUTE

### Salem, Massachusetts

The ESSEX INSTITUTE in Salem, whose main building dates from a hundred years ago, contains objects which have been accumulated over about the past hundred and fifty years. The museum, library, annex, Lye- Tapley shoe shop, Vaughan doll and toy house, and three show houses (John Ward, 1684; Peirce-Nichols, 1782; and Pingree, 1804) display the artifacts and accessories of Essex County's past, from pioneer and witchcraft days through Salem's great shipping era of the 18th and 19th centuries. The library's manuscripts, diaries, and copies of vital records afford documentation for some of these.

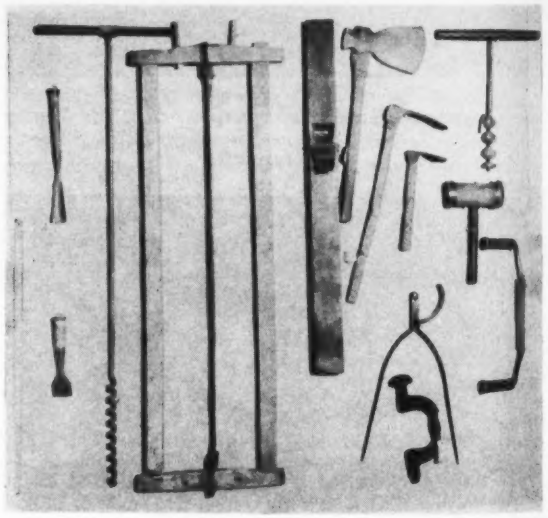
In the museum, fine early American portraits are brought to life by the adjacent collections of furniture and three period rooms, and by the articles of daily use, such as clocks, buttons, coins, costumes and uniforms, dolls and toys, samplers and laces, ceramics and metalwork. In the annex are displayed tools, old sewing machines, carriages, musical instruments, and the fire-fighting equipment of the local Fire Clubs of early days, including the Union hand-tub of 1748. There are also tools whose uses are not known to us, which we hope to have available for inspection.



*Fire Engine, Essex Institute, very likely the same type as the one Joseph Jenks was attributed with making at the Iron Works for the Town of Boston.*

On loan in the museum is the set of tools used by Samuel McIntire, (1757-1811), Salem's architect, decorator and carver, and architect of the Peirce-Nichols and Pingree houses. His delicately proportioned doorways and mantels with their wheat sheaves, flower baskets, and classical motifs form an appropriate setting for the American furniture following English styles, and for the Chinese export porcelain brought home by Salem sea-captains for the prosperous merchants of earlier days.

*Collection of fire fighting equipment, Essex Institute.*



*Tools used for ship building in Essex collection: 1, gouging chisel. 2, caulking chisel. 3, auger. 4, saw. 5, jack-plane. 6, broad axe. 7, dubbing axe. 8, small axe. 9, compass. 10, brace. 11, auger. 12, mallot. 13, hand-shave.*

(Continued on Page 12)

# Early American Industries
# THE BLACK ARTE

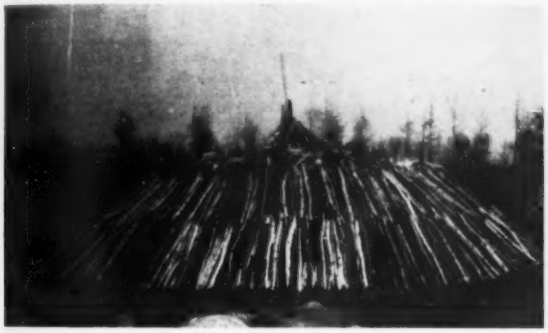
BY ELOISE STEDMAN MEYERS

When you broil that juicy steak over a charcoal fire in your backyard, have you ever thought what an important part this black vegetable fuel played in the history of this great country? Without charcoal we might even now be paying taxes to the English Crown rather than to our representative government in Washington.

Charcoal is as ancient as man's first experience with fire; its use as widespread as the world and as recent as our latest experiment adjusting man to space travel to the moon.

In the bronze and iron age these ores were smelted by the heat from burning charcoal. From Indian pottery found, there is proof these early inhabitants of America used charcoal to fire their ovens.

Practically pure carbon, charcoal is a fine, almost smokeless, fuel with a high degree of heat. For generations charcoal heat produced the best grade of iron and steel. Even today many of Sweden's blast furnaces, which make the world's finest steel, are charged with charcoal.



*Pit under construction, taken about 1915 in the western part of Massachusetts.*

Only a quarter of a century after the Pilgrims landed, a group of men gathered at Saugus, Massachusetts, to establish the first ironworks in this new world. The countryside abounded in hard wood forests to supply this fuel to operate the big furnace.

The job of collier was a highly skilled art. The pay of 27 pounds for a hundred loads of charcoal proved the envy of the manager and his specialized workers and the actual time and labor involved was much less than in the latter's duties. The colliers ran their affairs entirely separate from the rest of the ironworks. They were responsible to the "Agent" only. "Agent," however, was obligated to the company to see that the colliers gave full measure when the charcoal was delivered to the stone storage house.

From Saugus the discovery of iron and bog ore spread to all parts of New England and New York state. An ever-plentiful supply of wood for charcoal was found with each new furnace. Such became the fame of America's "fabulous" iron mines in Europe that speculators flocked here to grasp this great opportunity. One man from England became so intrigued by these reports that he came to western Massachusetts in the so-called Salisbury district. Here new townships were opening. Housatonic Township No. 1 needed a name. The settlers, honored by the presence of this Englishman, chose the name of his home, Tyringham.

The Salisbury Ironworks extended from southern Vermont, through western Massachusetts and Connecticut into New York state. It was here that charcoal helped to win America's Independence. The Salisbury forges became famous casting cannon used by the state and nation. Included in the entire works were hundreds

*Opening of Charcoal pit.*

of acres of woodlands to provide charcoal for this thriving industry. A deed of 1761 consists of the privilege of "cutting and coaling two thirds of proper coal wood" standing on the tract of land—about 375 acres. "The wood to be cut and brush piled according to husbandry." Charcoal was required in such large quantities that it was hauled from far and near. Many bonds, agreements, and contracts for this necessary supply, are found on file. The colliers at the Salisbury furnace regularly employed teamsters. Often journeys for the teams took several days to cover one hundred or more miles. Hamlets in the hills still bear the names, Coltsville or Coltshire, which were stopping places for "oating and baiting" and changing of horses.

From 1776-1777 the demands on the Salisbury Ironworks were so exhaustive that the forests were commandeered to provide the wood for charring. Additional wood cutters, colliers, teams and tools had to be supplied. Here charcoal helped to cast the anchors and chains for the Frigates, Constitution and Constellation. This furnace turned out close to one thousand each of heavy and light cannon. The Yankees were glad to burn the charcoal and sell to this company but there were just not enough Yankee colliers. They had to import a few hundred Swiss and Lithuanians. It was these men who named the big furnace, Mt. Riga. By 1810 when the Mt. Riga bellows groaned night and day, the numerous burning charcoal pits dotted the hillsides at night like stars in the heavens. The pits, sometimes 40 feet high, smouldered and smoked by day. These furnaces and forges supplied the muskets' barrels for the Springfield and Harper's Ferry arsenals. Muskets were sent to the Greeks in revolt against Turkey. Practically every forest in the Litchfield and Berkshire Hills smoked to make this possible.

By 1840 many of these furnaces and forges were abandoned. But when the Civil War started, those remaining were caught in another boom, for again charcoal iron was on call for new cannon. Once more the forges and furnaces ran night and day, the hillsides echoed the thud of the axe, the songs of the teamsters and the rumble of wagon wheels over the stones along every highway leading to the furnaces. Berkshire County's iron works alone employed fifteen hundred men which was more than in any previous year. Her forges cast the Rodman guns for the Monitor.

The end of the Civil War saw the expansion of the first continental railroad. Charcoal iron continued as best for chilled railroad car wheels. This gave a short boost

*Forge at Old Sturbridge Village, Old Sturbridge, Massachusetts, using charcoal.*

to the industry, but this vegetable fuel, so highly efficient in a cold-blast furnace, was living on borrowed time.

In 1837 George Crane of Wales succeeded in smelting iron by using hot air blast on anthracite coal thereby producing more tons in less time. Larger and better iron mines opened in the west and Pennsylvania where coal was at their door. Low grade ore could now be made into steel by the American Improved Bessemer method. This steel could be used in many products formerly reserved for high quality charcoal iron. The golden age of charcoaling was taking its exodus, for it was the cold blast furnaces that prospered the charcoal business.

Some historians consider the final blow to the ironworks in New England was the price of charcoal. Once an abundance of virgin timber was at the furnace's door. This provided charcoal at a fraction of a cent a bushel. In time this supply was exhausted. Our forests came to look like the crew-cut on men's heads. During the Civil War, New England's ironworks were forced to import charcoal from Pennsylvania and the north which brought the cost to 3c a bushel. By World War I it soared to 12 and 14c. War-time ceilings kept the cost at 20c. When the ceiling was removed it shot to 31c. One ton of iron required from 120 to 125 bushels of charcoal. Iron sold for $65.00 a ton, and increasing labor costs pared that margin of profit. Today, with faster production methods, lump charcoal, by the bag, averages 4c a pound or 80c a bushel.

Although the iron industry consumed the greatest part of the charcoal produced, this is a versatile product; it had other uses then and hundreds more today. The countryman filtered his drinking water through a barrel of charcoal. The former fed it to his hogs. The housewife charred a maple stick in her wood-burning stove, pounded it into fine tooth powder. The brewer found it unequaled for drying hops. Certain enterprising towns made roads of charcoal through marshy forests. One such in Michigan cost $660.00 a mile. Timbers 6 to 18 inches thick and 24 feet long were piled lengthwise in the center of the road to a height of 12 feet. These were well covered with earth and the timbers slowly charred. The charcoal was raked down to crown the road which became very compact and free from dust. Charred wood has exceptional resistance to decay.

Early in the twentieth century much of the charcoal used in this country was produced as a by-product of wood distillation plants. There were twenty-five distilling plants in the northeast alone, now there remains only one. These chemicals are replaced by synthetics which are cheaper and purer.

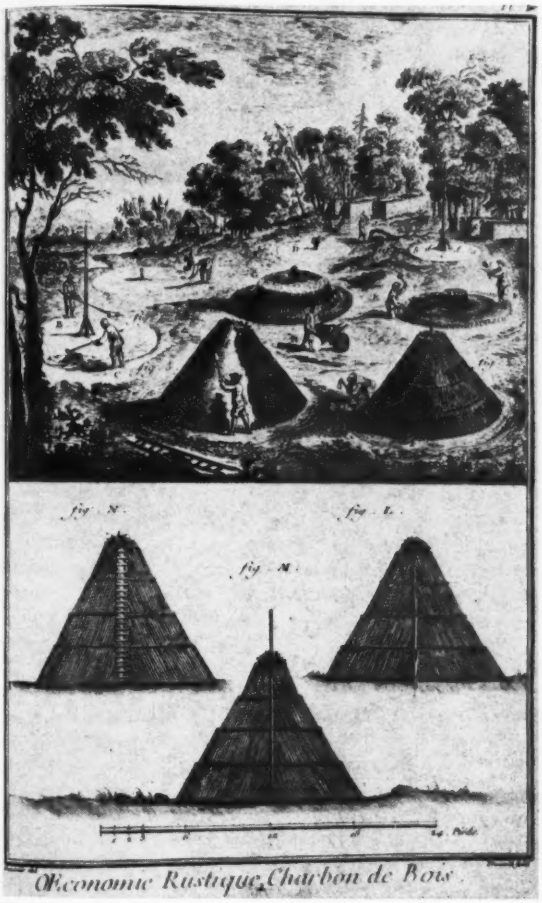
Nevertheless, the demand for this black carbon continues. With the advancement of science new means of utilizing this product are discovered. Activated charcoal plays its part in the rocket that shoots to outer space by purifying the air, for man or beast. Its current uses are varied and many, ranging from the metal industries to the medicine field, cosmetics, anti-freezes, art, gardening, explosives, brake linings, but above all — for cooking.

During the 18th century the expanding metals trade in Europe called for such enormous quantities of charcoal that their forests were alarmingly depleted. The government of France decided to commandeer her forests. The flourishing charcoal industry was threatened. A group of French Chefs threw up their hands in horror. No steak could be palatable unless charcoal broiled. So they submitted a Manifesto to their government stating without charcoal their culinary art would be ruined. Thanks to these famous French Chefs the charcoal industry was saved. Today no backyard or patio in America is complete without its charcoal grill, such was the French Chefs' influence. Yet the underprivileged peoples of the world, since time immemorial have fueled their braziers and heated their homes with charcoal.

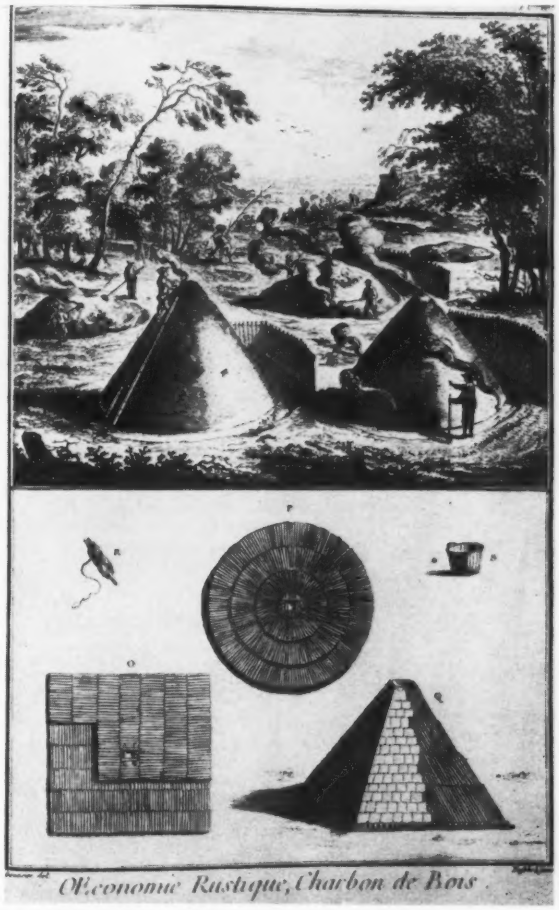
Wars cause many upheavals in normal living. In our recent wars wood and charcoal, as a fuel, staged a come-back. When World War II brought a severe gas shortage in Europe, France produced 100,000 charcoal generators for civilian use. Germany equipped 150,000 trucks and 30,000 tractors with the same. Even Switzerland resorted to charcoal generators.

Until the end of the 19th century the iron industry consumed the greatest part of the charcoal production.

By 1899 we produced only 171,543 tons; in 1909, 448,-278 tons which proved the peak year. From the U.S. survey of 1956 production reached 264,990 tons with the expectation of higher tonnage in 1957. It is interesting to note that an estimated one half of the 1956 production was used for outdoor cooking, picnics, restaurants and dining cars. Industrial use accounted for 35 to 40%. The remaining was for various uses like tobacco curing, poultry feed and water purification. Strange as it may seem the United States alone does not supply our demand. This same year we imported 13,522 tons.



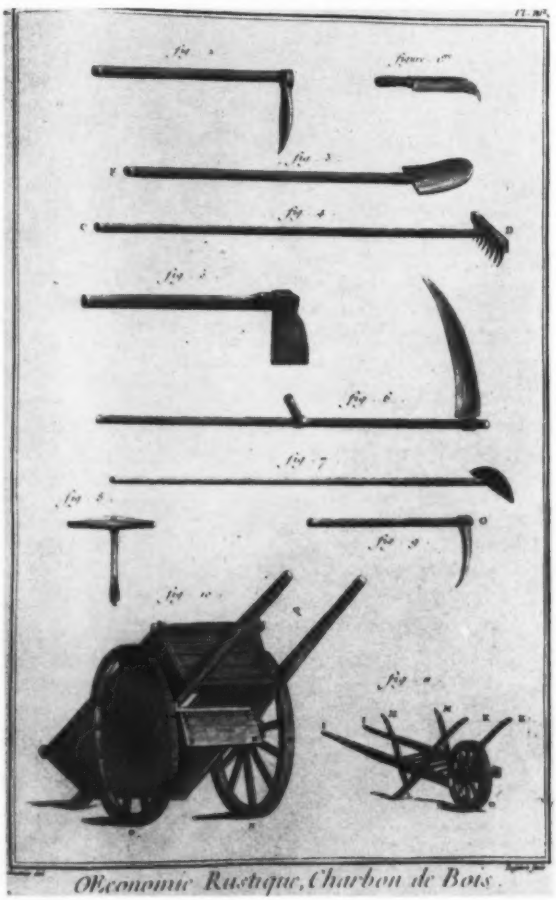

*Top of the plate shows various methods of constructing charcoal furnaces. A. The collier who is marking the outline of the kiln. B. A worker clearing the area. In the center is a billet to begin the chimney. C. A worker raking the area. D. The readied area with small billets over the center one. In this way the chimney is formed. E. A worker forming the first tier and has fastened the logs at the circumference with pegs. F. A worker who is sprinkling over the tier small pieces of wood called "chimney wood." This method is employed in all types of furnaces. N. Worker who is carrying wood. Figure 1 is the second method of constructing a furnace. After clearing the area in the center is placed a long pole "cc" against which the chimney and billets are placed. Figure 2. A furnace of the second type with all the stages "f, g, h, i," completed. The worker at the foot spades the ground, makes a chimney, and prepares to cover it with sod or with charcoal dust. K. is the end of a log that runs from the circumference of the furnace to the center and forms a passage that is used to light the furnace. Figure 3 shows the manner in which the coat of sod is applied in both types of furnaces. The entire surface is coated except the lower border where an open band is left to serve as a draft. Bottom of the plate, figure one is a vertical cut at the center of a furnace of the first type; M, of the second type; and, N. of the third type. (From Diderot)*




*Top of the plate represents the furnaces fired. Figure 4, a worker setting the first type furnace on fire. In the second type the fire is started at the bottom in the passages provided as shown in plate I, "K," figure 2. Figures 7 and 8, workers who are in the process of cooling an advanced burning furnace. The hurdles that are seen around the furnaces are called "killwind" or "break-wind." Bottom of plate: R, the tracer. S, basket for charcoal. Figure O, is the plan of the third-type furnace; P, the same but round shape; and Q, the elevation of a furnace of the third type. (From Diderot)*

# The Chronicle

Speed is the watchword of this 20th century. Even as the market has changed, so modern production methods are a "far-cry" from the old pit method used in Europe and early America. The old method required a man with skill and experience. Modern charcoal retort plants and kilns are built of brick, steel, cement or cinder blocks, using an outside heat, usually coal or natural gas. Air intake is automatically controlled. Specially designed, power-driven cars carry the wood to the large burning chambers. The same cars carry the coal out. The fastest production yet devised is by a new plant in northern New England. This company claims to produce charcoal in twenty minutes that traditionally took at least seventy-two hours. This is accomplished by chemically treating the wood and using the latest equipment.




*Tools: 1, bill-hook. 2, mattock or pickaxe. 3, shovel. 4, iron coal-rake. 5, axe. 6, scythe. 7, plane or beater. 8, picklock. 10, charcoal wagon. 11 wheelbarrow.*

With these new production methods has come a relative new form of raw material. Whereas, only hard round wood was once used, now soft woods, slabs, edgings and waste from saw mills are processed into "fines". This, mixed with water and a small percentage of starch are pressed into briquettes. Only three cords of such material will produce one ton of charcoal briquettes.

In the history of Jamestown, Virginia, reference is made to a man, "the one that in England had professed the black arte, not of a schollar, but of a collier of Croydon." Indeed, the traditional method of charcoaling may well be called the "Black Arte," for construction of a charcoal pit was more than an art, it was a science.

By pit is not meant an indentation in the ground but is the structure for charring. Colliers were skilled, highly paid and in great demand. In fact, many colliers were imported from Europe and Canada. Usually a master collier and one or two helpers coaled together, working as many as eight or more pits at a time. A site was selected in the heart of the forest on a level spot under a hill or elevation. The hearths were five hundred or more feet apart and the collier's hut was placed conveniently to the pits.

The colliers hut resembled a wigwam, with a base about 8′ in diameter and 10″ high. Stout poles or staddles were cut for the uprights, more slender ones filled the spaces between. The whole outside was covered with leaves to form a tight mat or base for the last covering of top soil. A door just large enough for a man to squeeze through was left on the pit side. The furnishings consisted solely of a wood-burning stove in the center and log bunks at the sides. It was here the collier and his helper lived during the long watch while the pit was burning.

The hearth or base of the charcoal pit was cleared of all vegetation, roots and stones, leaving only a hard, smooth, level surface 30 or 40 feet in diameter. Around the outside of this circular hearth the collier raked a mound of dust. An old hearth was considered ideal as the black dust from the previous burning was perfect for the dust rim. Often wood was hauled some distance to take advantage of an old hearth.

Wood for charring was cut during the winter months and allowed to partially air dry. As the season for firing was from May through October, the best weather months, the collier himself, often spent the winter months cutting the wood, making his baskets, rakes and shovels. The wooded section to be cut was divided into rows or narrow strips about "twenty axhandles" apart, extending the entire length of the tract. The wood cutters felled the trees so the tops would meet or overlap along these dividing lines.

The tree trunks were split into "billets" or sticks from 4″ to 7″ in diameter. The limbs went into "lapwood" from 1½″ to 4″ in diameter, each stick 4′ long. These were stacked and divided into cords. The ends of each piece were cut on a bias to help hold the leaves and dust blanket on the finished structure.

During the late spring months the hauler or teamster was ready with his crude wood sled, drawn by a mule or horse, to haul the "billets" and "lapwood" to the hearth. The road from the stacked wood led through the center of the hearth. The teamster drew the lapwood first which was laid crosswise on top of the dust ring. This acted as a support for the billets and lapwood to lean against. After that he drew both billets and lapwood, walking beside his horse, to the center of the hearth where he could conveniently set each piece on end, stacking deeper and deeper, around and around until the hearth was filled. From here on the collier and his helper took over.

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# The Chronicle

Early American
Industries Association, Inc.


The purpose of the association is to encourage the study and better understanding of early American industry, in the home, in the shop, on the farm, and on the sea, and especially to discover, identify, classify, preserve and exhibit obsolete tools, implements, utensils, instruments, vehicles, appliances and mechanical devices used by American craftsmen, farmers, housewives, mariners, professional men, and other workers.


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Communications regarding the contents of *The Chronicle* and back issues should be addressed to the Editors; suggestions for members to John P. Fox ;all other matters to the President Address as here given.

## DUES

The annual dues are payable on January 1st and are $5.00. The *Chronicle* is published quarterly and is sent to all members without additional charge. Printed on the press of The *Virginia* Gazette, founded 1736, *Williamsburg, Virginia.*

*President Emeritus, Lewis N. Wiggins receiving a hand-bound copy of the 25th Anniversary Issue of the "Chronicle" at the Dearborn Meeting, October 1958. This copy bound by C. C. Samford, Master Bookbinder of Colonial Williamsburg is being presented by past President Edward Durell of Columbus, Ohio, while Dr. Fred C. Sabin, President of the EAIA looks on.*

## MEMBERS EXHIBITS

MINER J. COOPER

The Whatsit Program will be eliminated at this meeting due to a shortage of time, and in its place a special exhibit is being arranged, which we expect may be one of the largest assortments of some of the country's most outstanding rarities in tools and devices ever assembled in one display.

This exhibit is to consist of items from the collections of members which they consider outstanding or extremely rare, or interesting from any other point of view. The exhibit will be limited to *two* items per person.

Each member is urged to bring two (only) articles from his collection, to each of which is attached a typewritten card showing owner's name and address, the name of the article, the craft in which it was most generally used, and any other information that would be interesting to our members, such as the source, and unusual features.

It is suggested that each owner, if at all possible, secure a good glossy photograph of each article, and attach to it a duplicate descriptive card which also includes the measurements. It is our intention that if the response to this is adequate, we will be able to choose photographs of a number of these items for publication in the *Chronicle.* If the exhibit, and the number of photographs, reaches the proportions we anticipate, the photographs and descriptions will be published in pamphlet form . If publication in pamphlet form becomes possible, we may also decide to canvass members who were unable to attend the meeting for photographs and description of *their* two most outstanding pieces. In order to carry out such a plan, it will be necessary that each person consider this, and its possibilities, and provide us with the necessary photographs, and the information about his article. We trust this suggestion meets with the approval of our members.

Because we are primarily tool collectors, we feel that these articles should be either tools or mechanical devices. However, any article of another nature which illustrates a craft, or craft operation, will be acceptable. Members who do not have tools in their collection, are urged to bring their rarest and most unusual utensil or device. We are particularly interested in this respect, in articles used in connection with craft activities, or old-time, obsolete activities and processes in and about the home and farm.

While the identification of unknown tools and devices is one of the primary reasons for our Association's existence, the study of tools and devices many of us have never seen is also of great importance. Furthermore, we have so many new members who want to learn what we so-called "experts" already know, that the above described exhibit would add a great deal to their pleasure and interest, and might be the means of stimulating their efforts to secure and preserve outstanding pieces. We trust this is a step forward.

Please deliver your photographs and descriptions to the registration clerk at the time you register. You will be informed there where to deliver your exhibits. Mr. Miner J. Cooper will be in charge of the project, and any further questions may be answered by him.

## AUCTION

At the Old Saugus meeting, June 27-29, 1959, the third EAIA Auction will be held. As our Association benefits from this event, members are urged to bring duplicates or other items they wish to dispose of to the meeting. This event is entertaining and financially beneficial to all involved; so let us have your support.

## REGIONAL MEETING

A regional meeting for members of the EAIA in the Massachusetts, New York, and Connecticut areas will be held at the Shaker Museum in Old Chatham, New York, on May 17. Members in this area will receive advance mailings in the middle of April and those further interested may contact Mr. Joe Rake, P. O. Box 591, Newburgh, New York.

## Interesting Publications

The Shelburne Museum, Shelburne, Vermont, has recently added a new book "Life in the Colchester Reef Lighthouse." The 48 page booklet is a digest of the most interesting things that happened to the Lighthouse-keepers and their families between 1871 and 1933 while living in this desolate spot. The lighthouse was built in 1871 in Lake Champlain, north of Burlington, Vermont, to protect ships and shipping from the bad reefs there. Located a full mile offshore, without telephone or radio, it was a life apart from the rest of the world. Various incidents that occured during the history of the lighthouse have now been recorded and the book is illustrated with authentic drawings. Included also is a chapter describing the present contents of the Old Lighthouse in her new home on the grounds of Shelburne Museum. This booklet is the second in this series of publications by the Shelburne Museum, telling of the ways of life of earlier generations in America.

The Connecticut Historical Society, Hartford, Connecticut, has recently published a new book "Shop Records of Daniel Burnap, Clockmaker," by Penrose R. Hoopes. This is based upon account books, letters, and more than 200 tools and a unique memorandum book, commencing September 1779, in which Burnap recorded the secrets of his craft, with drawings of some tools necessary in the making of clocks. All of these drawings are reproduced in the book, as well as a good portion of the more than 200 tools that are in this collection. Information concerning the book may be had by writing to Mr. Thompson R. Harlow, Director, The Connecticut Historical Society, 1 Elizabeth Street, Hartford, Connecticut.

The Past Times Press, 492 Riverside Avenue, Trenton 8, New Jersey, has recently published "The Revolutionary Saltworks of the New Jersey Coast, With Notes on the Early Methods of Making Salt in New England, New York, Delaware and Virginia," by Harry B. Weiss and Grace M. Weiss. The edition is limited to 200 copies. Price $4.00 postpaid.

When salt was scarce during the Revolutionary War, the Continental Congress and the Colonial governments met the emergency by encouraging salt production by the solar evaporation of sea water. Various saltworks were built along the Atlantic Coast. The history of this early industry is covered in detail. The early methods of manufacture are outlined. The construction of a "salt marsh" is described as are also the various steps leading to the finished product. In addition there are chapters on the destruction of salt works by the British and historical material on salt-making in China and Europe.

## FORT DELAWARE

NARROWSBURG, NEW YORK

Fort Delaware at Narrowsburg, New York, tells the story of the Delaware Company, a handful of intrepid pioneers who, in 1754 came here from Connecticut, purchased lands from the Delaware Indians, and erected their settlements in the face of every conceivable hardship. It is an educational institution, chartered by the New York State Education Department as a museum. It shows how the settlers lived in the Indian country during the years of peace and how they defended their lives and property in times of Indian raids and war.

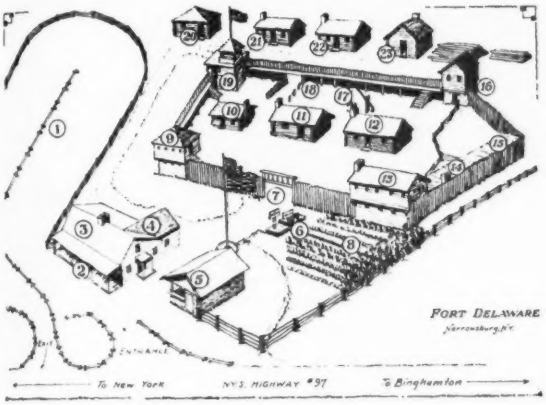
Fort Delaware represents the buckskin variety of American frontier fortification as distinguished from the many splendid military installations built during the same period. The Fort consists of a stout stockade surrounding cabins, blockhouses, gun platforms, storehouse, blacksmith shed, armory and animal yard. You will see here the types of construction and methods used in the building of a frontier settlement 200 years ago. You will see, also, how our forefathers lived in an age void of electricity, gas, machinery, television and radio, when the upper Delaware Valley was yet the wild and untamed frontier. The dwelling cabins of the settlers are constructed and furnished in a most authentic manner. Likewise, the blockhouses and all other structures have been erected in accordance with the findings of painstaking research. It is an excellent study in the history of the Colonial American Frontier.

Mr. James W. Burbank, president of Fort Delaware, Inc., is a member of the EAIA. Mr. Miner J.

Cooper, our Whatsit Chairman, has been officially appointed "Consultant — Antique Tools, Utensils, and Furnishings." We know that Mr. Cooper has spent considerable time and research on this worthwhile project and that many of the furnishings have come from his collections.

The Fort is located directly on New York State Highway No. 97 at Narrowsburg, New York, which lies halfway between Port Jervis, New York and Hancock, New York. Open: May 30 to Columbus Day. Hours: 10 a. m. to 6 p. m.

We trust that many of our members nearby will have the opportunity to visit this latest achievement in preserving our early history.




Free Parking, 2. Entrance to Gate House, 3. Gift Shop, 4. Admission Desk and Rest Rooms, 5. Sandwich and Soda Bar, 6. Stocks and Pillory (Photographer's Delight), 7. Main Gates to Stockade, 8. Colonial Herb Garden, 9. South Blockhouse, antique tools and weapons, 10. Dwelling Cabin No. 1 (circa 1756), 11. Dwelling Cabin No. 2 (circa 1763), 12. Dwelling Cabin No. 3 (circa 1775), 13. Storehouse, Craft Exhibits, 14. Blacksmith Shed (Ancient forge and bellows in operation), 15. Stables and Animal Yard (Live domestic animals), 16. North Blockhouse, farming necessities, 17. The Well, 18. The Sally Port, 19. Armory and Gun Platform (Swivel gun being fired), 20. Museum of the Delaware Indian*, 21. Museum of the Delaware Company*, 22. and 23 Future Museum Buildings.

* Under construction.

## The Black Arte

(Continued from Page 8)

The collier determined the center of the hearth where he threw out enough lapwood to get down to the base. At this point the helper handed down the "fagan." (A green pole about 18′ long and 3″ or 4″ around.) The collier drove the fagan into the exact center of the hearth enabling it to stand upright. Then the helper handed over the cast-off lapwood. The collier used this to construct the chimney around the fagan. This lapwood was laid crisscross in a triangle with ends overlapping. The opening left in the center was about 8″ across. The chimney was built in this fashion 5′ high. Billets were laid upright against the chimney in a slanting position, bottom ends projecting outward. This procedure was continued outwardly, forming a solid ring to the dust mound. Each row protruded at the bottom, forming a mount-like slope. The first tier of wood was called the "foot."

The collier climbed the "foot" to his chimney where he added another 4′ or so. From this he started a second tier of billets, sloping outwardly in the same manner as the first. This second tier was known as the "waist." Spaces in each tier of billets were filled with lapwood and small pieces to make the pit as tight and firm as possible. Great care was taken to prevent the finished pit from "realing" or twisting.

Again, the collier, standing on the waist, raised his chimney a few more feet. This time he set his lapwood in or near a horizontal position, radiating from the center of the chimney, building out the shoulders and finally the flat "head" to the top of the chimney. This formed the rounded, mould-like structure. All possible air spaces and cracks were checked over the entire surface and filled in with lapwood. This final process was called "lapping-off."

The collier made his ladder from an 8″ log to extend from the ground to the chimney opening. He carried chips and fine kindling up this ladder — enough to fill the chimney within a foot of the top. A "bridgen" of billets and several pieces of lapwood covered the chimney.

Now the pit was ready for "leafing and dusting." The helper, with a crude, long-toothed rake, gathered the leaves from the ground into piles. Then he filled the collier's basket and scattered them uniformly over the entire surface of the pit, several inches deep. This was followed with the dust from the outer rim of the hearth, thicker over the head and shoulder. A bushel of dust over the head for each cord of wood in the pit was the rule.

Great caution was necessary in "firing" the pit. The collier climbed to the bridgen, carefully scooped back enough leaves and dust and two of the bridgen billets to permit a shovelful of red-hot coals to fall on the kindling. He was particularly watchful that no dust or leaves should fall back into the chimney when he returned the covering.

Before the long watch began the collier needed a good night's rest so he usually fired his pit at dusk. It was expected the pit would not burn through or need attention before the next afternoon. However, the last thing before taking to his bunk, the collier made sure his pit was tight and no more dust needed. For it was, and still is, the control of the draft to induce slow burning that causes the wood to char rather than burn.

In different localities pits varied in size but the average hearth in this country was 30 to 40 feet in diameter and held from 25 to 50 cords of wood.

Although all species of wood are used in making charcoal today, the hard woods were considered to produce the best quality. Oak, hickory, maple, beech, birch, as in this order, have always been the most desirable for high quality charcoal.

The success in charring the pit depended upon the skill and constant tending by the collier. A burning flame was fatal, a "dead fire" absolutely necessary. The degree of heat or fire was governed by the amount of air allowed to enter. So each night this skilled artisan climbed his ladder, cautiously stepped around the head and bridgen,

(Continued on Page 12)

## Essex Institute

(Continued from Page 4)

*Tools: Essex Institute. Two draw knives, frow, offset short handle broad axe.*

## PEABODY MUSEUM

For the last century the Peabody Museum of Salem has been collecting the tools, gear, and samples of work of all the maritime tradesmen. Today the collection includes equipment used by coopers, sailmakers, riggers, ship carpenters, ship draughtsmen, navigators and seamen. They are not confined to English North America alone, but cover many European countries as well. Along with the maritime objects there are similar collections from the Far East and the Pacific Islands . The materials from Japan range from such true artists as porcelain-makers, sword-smiths, ivory-carvers and print-makers to artisans such as carpenters, clockmakers, firemen and medical men.

While many items are on exhibition there are also large study collections. Of special interest to the members will be the excellent display of Scrimshaw carvings.

## The Black Arte

(Continued from Page 11)

to seek out any soft spots or "mulls" where the wood had shrunk or settled. When he found one he stomped heavily back and forth on the firm part working slowly toward the mull. Here he carefully and slowly dug out the spot, filled it with new wood, leaves and dust to keep the pit firm. This was called "jumping the pit" and considered a dangerous job. Only with this task completed could the collier rest easily in his bunk.

Throughout each day, at intervals, this man climbed to the chimney, removed the bridgen and rammed the fagan up and down. By the *feel* of this tool he could gauge the location and extent of charring. To correct an uneven burning, holes or vents were made in the foot where more draft was needed. If the pit burned uniformly a puff of blue smoke occasionally spurted from the vent exuding an odor of pitch or tar. It has been said this gave the coalers a ravenous appetite. When these puffs were white there was too much draft or too dry wood. Wind and rain were detrimental to successful charring.

The length of time required for a pit to "burn off" depended upon the size of the hearth, the kind of wood, or weather conditions. The average time for 30 cords of partly seasoned wood to char, under favorable conditions, was from ten days to two weeks.

But that was not the end of the job, by any means, for charcoal carries fire a long while. It took still more time to cool and rake out the coal. The collier opened the pit where he thought the dust was the driest. A little at a time, he shoveled out the coal along the outer rim. If he found signs of fire he hurriedly threw back the dry dust to reseal the pit and wait. Seldom was water found near the hearths so dust was their only means of quenching fire.

When the coal was cooled, just at sunup, the wagons rolled in. Those who remember the charcoal wagons describe them as varied in size according to the number of horses or mules to pull them. Each wagon was built to extend in width beyond the wheels, with high side boards and a sliding floor. In fact the load was so high and wide that the only view for the driver was straight ahead. The helpers raked the charcoal into three-bushel, shallow baskets. They helped the teamster swing the basket onto his head where he carried it to his wagon. The baskets were porous, the coal left a black carbon dust. Traditional charcoaling must, indeed, have been a *Black Arte.*

Old Sturbridge is one of the restored or replica old villages that operates an old forge with charcoal heat.

## PROGRAM AT OLD SAUGUS

FRIDAY, June 26

9:00 a. m. Registration. Exhibit and examination of members' choice items at Hotel.

12:30 p. m. Luncheon at Hotel.

2:00 to 4:00 p. m. Tour of Iron Works Buildings, examination of artifacts excavated and a number of Iron Work's Whatsits.

7:00 p. m. Dinner at Hotel.

8:15 to 10:15 p. m. Auction of members' duplicates.

SATURDAY, June 27

9:00 a. m. Directors' meeting.

10:00 a. m. to 5:00 p. m. Tour of Historic Salem with special tool exhibit at Essex Institute & Peabody Museum.

7:00 p. m. Banquet and Annual meeting. Colonel Edward Clark will speak on Whales — Whaling and Scrimshaw.

SUNDAY, June 28

Tour of Iron Works.